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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
CURS, NATHAN M	

ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/642,479	DUAN ET AL.	
	Examiner	**Art Unit**	
	NATHAN M. CURS	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _08 October 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _36-47_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _36-47_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _15 August 2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 36 and 43-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jasti et al. ("Jasti") (US Patent Application Publication No. 2005/0069248) in view of Chung et al. ("Chung") (US Patent No. 6433864).

Regarding claim 36, Jasti discloses a method of monitoring channels of an optical add/drop multiplexer having sequentially arranged first and second drop channels and sequentially arranged first and second add channels (fig. 3 and paragraphs 0024 and 0025), the method comprising: receiving an input signal at an input of the optical multiplexer (fig. 3, the WDM input signal to input port 302); dropping a first signal from the input signal via the first drop channel (fig. 3 element 304_1); tapping a portion of the first signal (fig. 3 element 310_1); detecting an optical power of the first drop channel using the tapped portion of the first signal (fig. 3 element 314_1 and paragraph 0024); dropping a second signal from the input signal after the first signal has been dropped from the input signal, via the second drop channel (fig. 3 element 304_2); tapping a portion of the second signal (fig. 3 element 310_2); detecting an optical power of the second drop channel using the tapped portion of the second signal (fig. 3 element

314_2 and paragraph 0024); monitoring performance of a third signal that is to be added to the input signal (fig. 3 element 314_4 and paragraphs 0024 and 0025, where detecting optical power of the signal reads on monitoring performance of the signal); adding the third signal to the input signal after the first and second signals have been dropped from the input signal, via the first add channel (fig. 3 element 304_4); monitoring performance of a fourth signal that is to be added to the input signal (fig. 3 element 314_5 and paragraphs 0024 and 0025, where detecting optical power of the signal reads on monitoring performance of the signal); and adding the fourth signal to the input signal after the third signal has been added to the input signal, via the second add channel (fig. 3 element 304_5). Jasti discloses detecting the optical power of the dropped signals (fig. 3 elements 314_n and paragraph 0024), but does not specifically disclose determining OSNR of the dropped signals. Chung discloses individually monitoring OSNR for the WDM channels of an add/drop node (fig. 7 and col. 7 line 59 to col. 8 line 7), by tapping the channel signal, detecting characteristics of the signal and calculating OSNR (fig. 3 and col. 5 line 45 to col. 6 line 21). It would have been obvious to one of ordinary skill in the art at the time of the invention to modifying Jasti, adding OSNR monitors like those of Chung to each of the drop channels of Jasti, utilizing Jasti's existing optical channel taps for the corresponding elements of the channel OSNR monitors, in order to use the channel OSNR measurements to achieve more effective maintenance of the system, as taught by Chung (col. 1 lines 34-40).

Regarding claim 43, the combination of Jasti and Chung discloses the method of Claim 36, wherein the optical signal to noise ratio is based on the following equation:

$OSNR = \frac{p_{sig}}{P_{ase}} \frac{B_o}{R}$ where the symbol "Psig" denotes a signal power of the sampled points, the symbol "Pase" denotes an Amplified Spontaneous Emission (ASE) power of the sampled points, the symbol "Bo" denotes a filter band width, and the symbol "R" denotes a wavelength resolution (Chung: col. 4 lines 40-63).

Regarding claim 44, the combination of Jasti and Chung discloses the method of Claim 36, wherein the first drop channel includes a performance monitor cell and a filter (Jasti: fig. 3 and Chung: fig. 3 as applicable in the combination, where the OSNR monitor is a performance monitor cell and the capacitor is a DC filter).

Regarding claim 45, the combination of Jasti and Chung discloses the method of Claim 44, wherein the performance monitor cell includes a coupler which is used in tapping the portion of the first signal (Jasti: fig. 3 elements 310_1 and Chung: fig. 3 element 101, as applicable in the combination).

Regarding claim 46, the combination of Jasti and Chung discloses the method of Claim 36, further comprising transmitting an output signal from an output of the optical multiplexer (Jasti: fig. 3 element 308).

Regarding claim 47, the combination of Jasti and Chung discloses the method of Claim 36, wherein each add channel includes a variable attenuator (Jasti: fig. 3 elements 316_n), a performance monitor cell and a filter (Jasti: fig. 3 and Chung: fig. 3 as applicable in the combination, where the OSNR monitor is a performance monitor cell and the capacitor is a DC filter).

3. Claims 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jasti (US Patent Application Publication No. 2005/0069248) in view of Chung (US Patent No. 6433864) as applied to claims 36 and 43-47 above, and further in view of Ames et al. ("Ames") (US Patent No. 6661817).

Regarding claim 37, the combination of Jasti and Chung discloses the method of Claim 36, wherein analyzing the portion of the first signal to determine the optical signal to noise ratio comprises: converting the portion of the first signal to a digital signal (Chung: fig. 3 element 106 and col. 5 line 51 to col. 6 line 21); determining an average power (Chung: fig. 3 element 109 and col. 5 line 66 to col. 6 line 5); and calculating a noise spectrum density based on the digital signal and determining the OSNR from the noise spectrum density and the average power (Chung: fig. 3 element 108 and col. 6 lines 14-21). Chung discloses monitoring the average power of the tapped signal (fig. 3, element 109 and col. 6 lines 3-5 and lines 17-21), and discloses A to D conversion for the FFT (fig. 3, element 106 and col. 6 lines 11-16), but aside from the sampling inherent to the A to D conversion, Chung does not disclose further sampling a plurality of data points in the digital signal continuously at a sampling frequency, nor that the noise spectrum density is based upon the sampled points of the digital signal (as opposed to the digital signal directly), nor determining the average power of the sampled points. Ames discloses monitoring optical power using a photodiode followed by an current to voltage conversion followed by A to D conversion of the voltage followed by sampling the digital voltage signal and calculating the average optical power using the sampled digital voltage (fig. 1 and col. 5, lines 32-50 and col. 6, lines 1-47). It

would have been obvious to one of ordinary skill in the art at the time of the invention to modifying the optical power detection method of the OSNR measurement of the combination with the digital average optical power detection method of Ames, to provide the advantage of being able to store the calculated optical power values in memory for monitoring.

Regarding claim 38, the combination of Jasti, Chung and Ames discloses the method of Claim 37, but as described above the combination does not compute the average optical power using a pre-saved calibration table. However, Ames does disclose evaluating average optical power results to determine if they are within an expected tolerance range, by using pre-saved reference coefficients determined during manufacturing and stored in a memory (col. 5, lines 32-50 and col. 6, lines 1-47), which read on pre-saved calibration data stored in a table. It would have been obvious to one of ordinary skill in the art at the time of the invention to use pre-saved reference coefficients in computing the average optical power of the combination, in order to determine if the average optical power results are within an expected tolerance range.

Regarding claim 39, the combination of Jasti, Chung and Ames discloses the method of Claim 37, but does not disclose that the plurality of data points is approximately 1024 points. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to calculate the average optical power of the A to D converted continuous voltage using 1024 continuous samples for the calculation, since averaging over any large number of points results in a more accurate average than averaging over a small number of points.

Regarding claim 40, the combination of Jasti, Chung and Ames discloses the method of Claim 37, wherein the plurality of data points is sampled for a predetermined amount of time (Ames: col. 6, lines 1-47, as applicable in the combination, where the data points are sampled for an inherent predetermined amount of time).

Regarding claim 41, the combination of Jasti, Chung and Ames discloses the method of Claim 37, but does not disclose that the predetermined amount of time is 10 ms. However, the system of the combination is a WDM system (Jasti: fig. 3 and Chung: col. 1 lines 7-15). The Office takes official notice that 10 ms is much longer than the bit period of conventional WDM signals. It would have been obvious to one of ordinary skill in the art at the time of the invention to sample for 10 ms since averaging over any large number of points results in a more accurate average than averaging over a small number of points.

4. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jasti (US Patent Application Publication No. 2005/0069248) in view of Chung (US Patent No. 6433864) as applied to claims 36 and 43-47 above, and further in view of Shin et al. ("Shin") (*A novel optical signal-to-noise ratio monitoring technique for WDM networks*, Shin et al.; Optical Fiber Communication Conference, 2000; Volume 2, 7-10 March 2000 Pages: 182-184), and further in view of Ames et al. ("Ames") (US Patent No. 6661817).

Regarding claim 42, the combination of Jasti and Chung dislcoses the method of Claim 36, wherein analyzing the portion of the first signal to determine the optical signal

to noise ratio comprises: selecting a frequency range (Chung: col. 6 lines 14-16); converting the portion of the first signal to a digital signal (Chung: fig. 7, fig. 3 and col. 5, line 51 to col. 6, line 21); determining an average power determining an average power (fig. 3 element 109 and col. 5 line 66 to col. 6 line 5); generating a spectrum in the frequency domain utilizing a Fast Fourier Transform (Chung: fig. 3 element 107 and col. 6 lines 14-16); generating a noise spectrum density from the spectrum and a frequency range and calculating the optical signal to noise ratio from the noise spectrum density and the average power (Chung: col. 6 lines 17-21). The combination does not disclose selecting the frequency range based on network traffic protocol and transmission rate. Shin discloses essentially the same method of monitoring OSNR as Chung, and discloses 10 Gb/s data rates in the context of WDM technology and selecting a frequency range based on network traffic protocol and transmission rate (pages 182 section "1. Introduction" and first paragraph of section "11. Experiments", where using the FFT data in the range of 40 - 50 kHz for the 10Gbps pattern signal reads on selecting a frequency range based on network traffic protocol and transmission rate). It would have been obvious to one of ordinary skill in the art at the time of the invention to select the frequency range based on network traffic protocol and transmission rate in the combination, so that the FFT information corresponds to the actual network traffic. Also, the combination does not disclose sampling 1024 points in the digital signal continuously at a sampling frequency, nor that the average power and OSNR are determined from the sampled points of the digital signal instead of the digital signal itself. Ames discloses monitoring optical power using a photodiode followed by an

current to voltage conversion followed by A to D conversion of the voltage followed by sampling the digital voltage signal and calculating the average optical power using the sampled digital voltage (fig. 1 and col. 5, lines 32- 50 and col. 6, lines 1-47). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the optical power detection method of the combination with the digital average optical power detection method of Ames, to provide the advantage of being able to store the calculated optical power values in memory for monitoring. Further, it would have been obvious to one of ordinary skill in the art at the time of the invention to calculate the average optical power of the A to D converted continuous voltage using 1024 continuous samples for the calculation, since averaging over any large number of points results in a more accurate average than averaging over a small number of points.

Response to Arguments

5. Applicant's arguments with respect to new claims 36-47 have been considered but are moot in view of the new ground(s) of rejection based on Jasti.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN M. CURS whose telephone number is (571)272-3028. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/NATHAN M CURS/

Examiner, Art Unit 2613